SAVAC

(Super Agro Value Addition Chain)

Concept Note

Introduction

Start a clean supply chain Soil to kitchen of Turmeric crop by incorporating new age technologies with farming partners Turmeric is a staple spice in India, apart from culinary, turmeric is getting global attention due to its medicinal properties. India contributes 80% to global production. Same time adulteration and over use of pesticide is a major problem. One study shows lead concentration in turmeric exceeds limit by 500 times making it poisonous substances used in everyday cooking. This trend has appeared for 10-20 years and we intend to provide a win win-win solution for farmers, customers and ICAR Institutions.

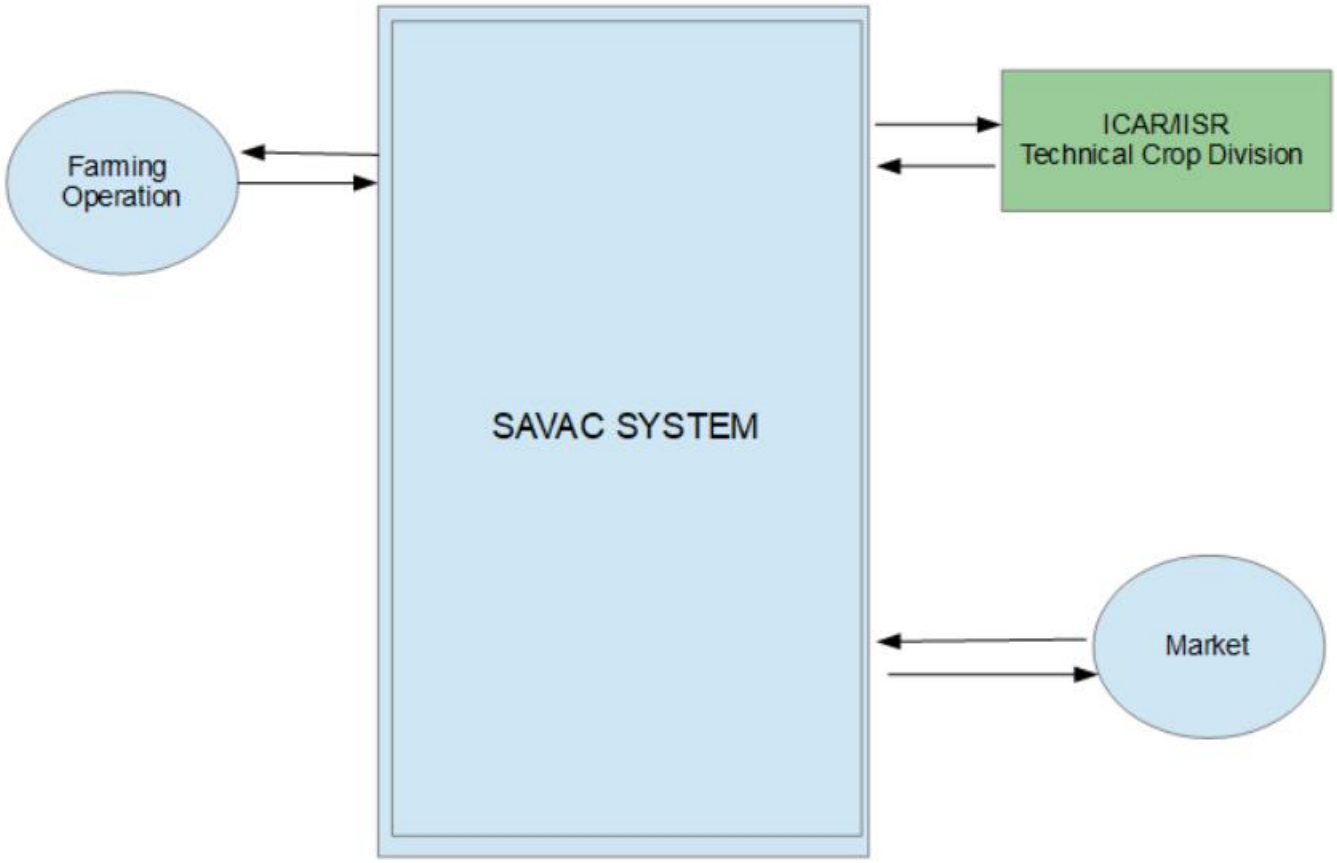
Modern problems required modem solutions.

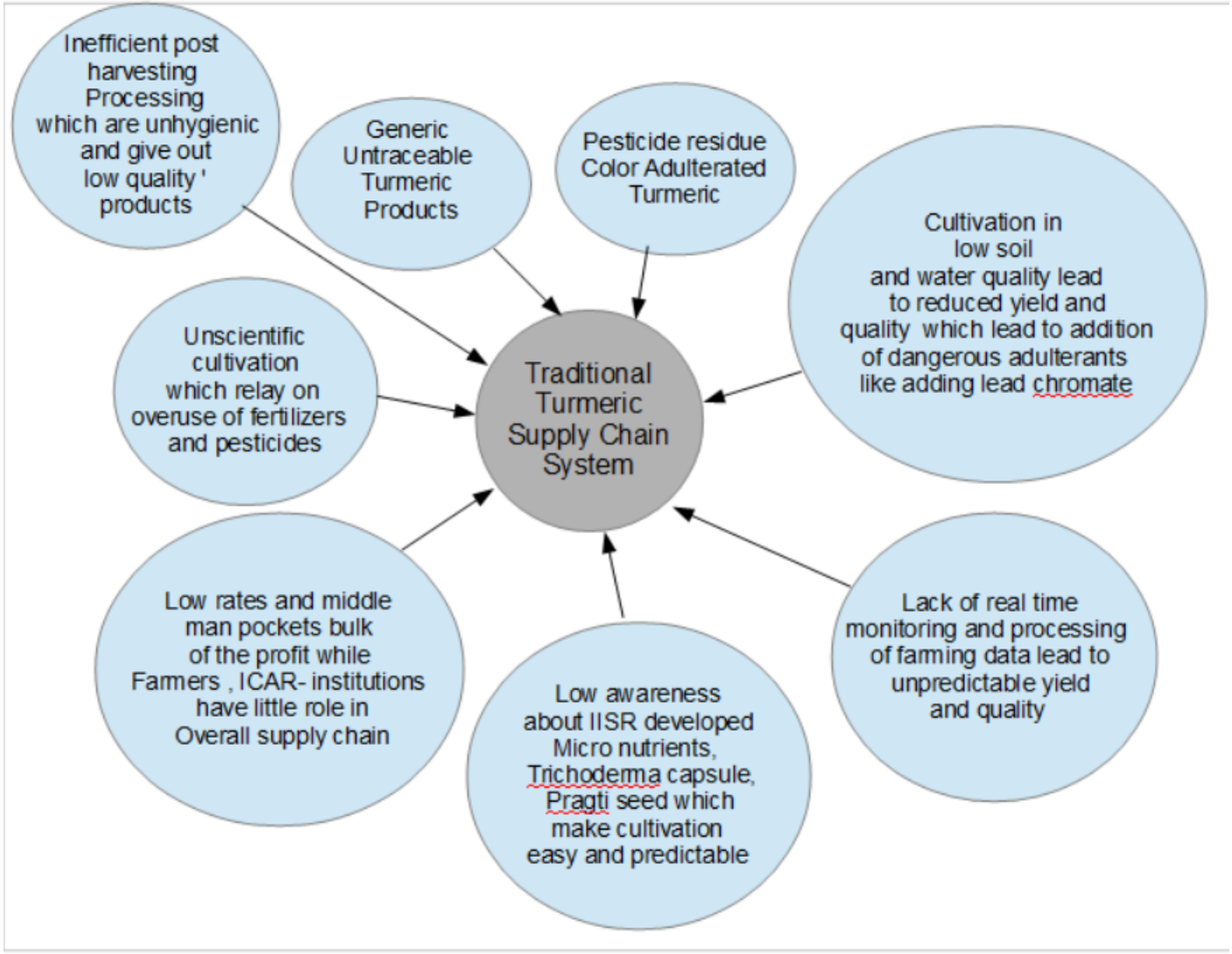
We will incorporate new age technologies and equipment like portable digital soil testing lab, micro nutrient, block chain, online disease recognition etc. to upgrade Turmeric farming. We will associate with farmers groups and initiate a buy back scheme under conditions such as access to farm and strict control of inputs used in cultivation. Farmers contribute man power while the technicality is handled by our team. The “clean “raw materials will be sold as seeds and value addition products.

Our products are natural, innovative and come with purity tested reports, traceability and make valued customers part of farmer friendly supply chain.

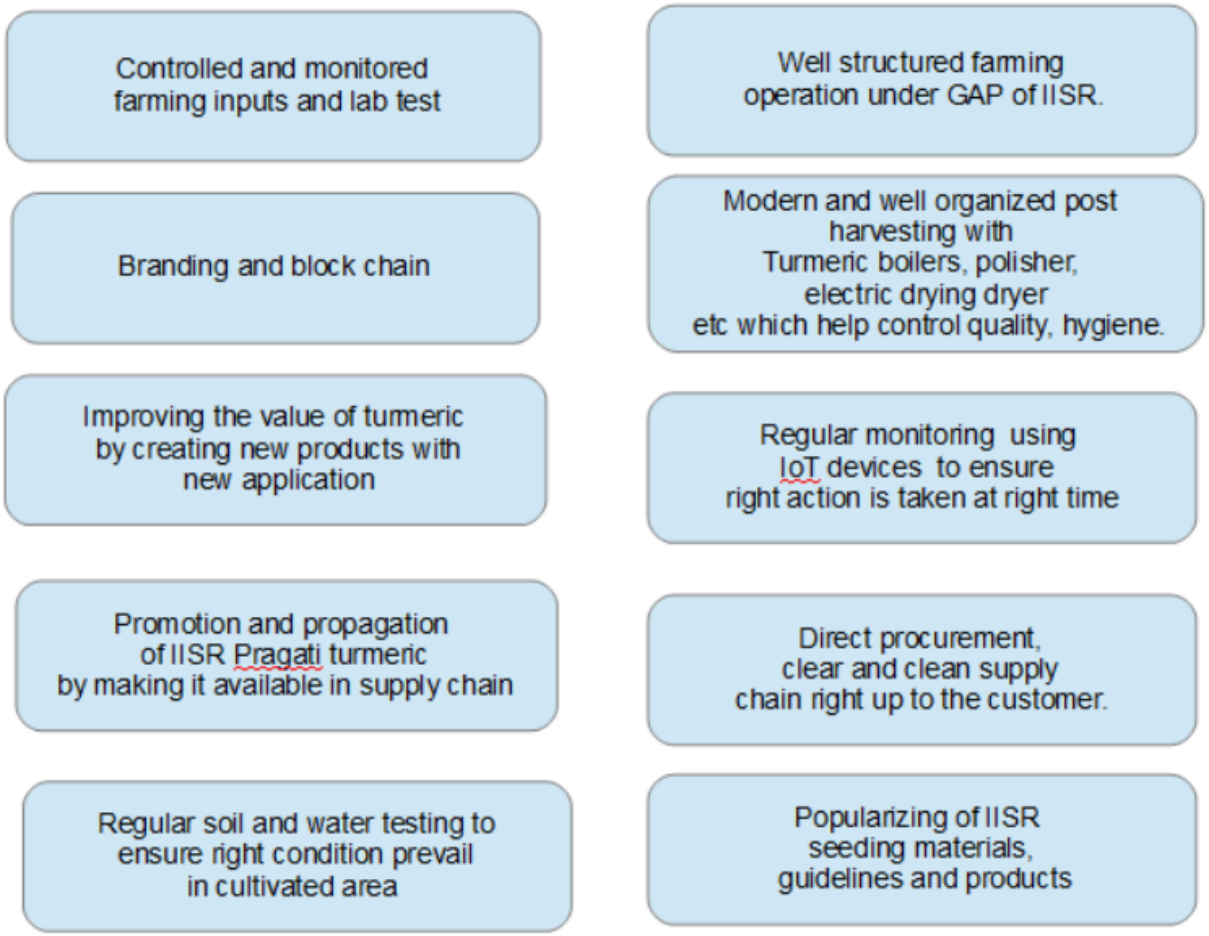
Please refer the blow diagram and flow chart to understand our concept and execution.

SAVAC Data Flow Architecture

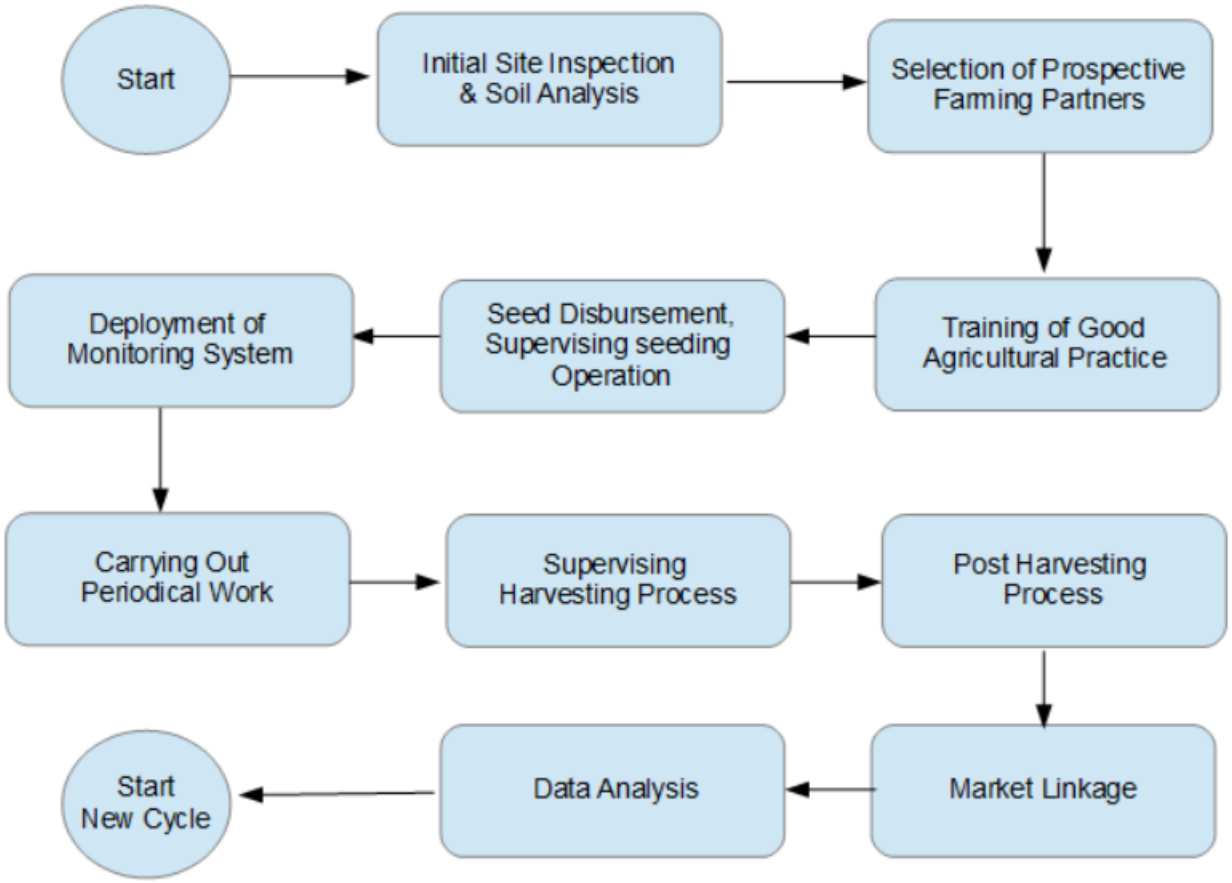



Inefficient post harvesting Processing which are unhygienic and give out low quality ' products
Generic Untraceable Turmeric Products
Pesticide residue Color Adulterated Turmeric
Cultivation in low soil and water quality lead to reduced yield and quality which lead to addition of dangerous adulterants like adding lead chromate
Unscientific cultivation which relay on overuse of fertilizers and pesticides
Traditional Turmeric Supply Chain System
Low rates and middle man pockets bulk of the profit while Farmers , ICAR- institutions have little role in Overall supply chain
Low awareness about IISR developed Micro nutrients, Trichoderma capsule, Pragti seed which make cultivation easy and predictable
Lack of real time monitoring and processing of farming data lead to unpredictable yield and quality

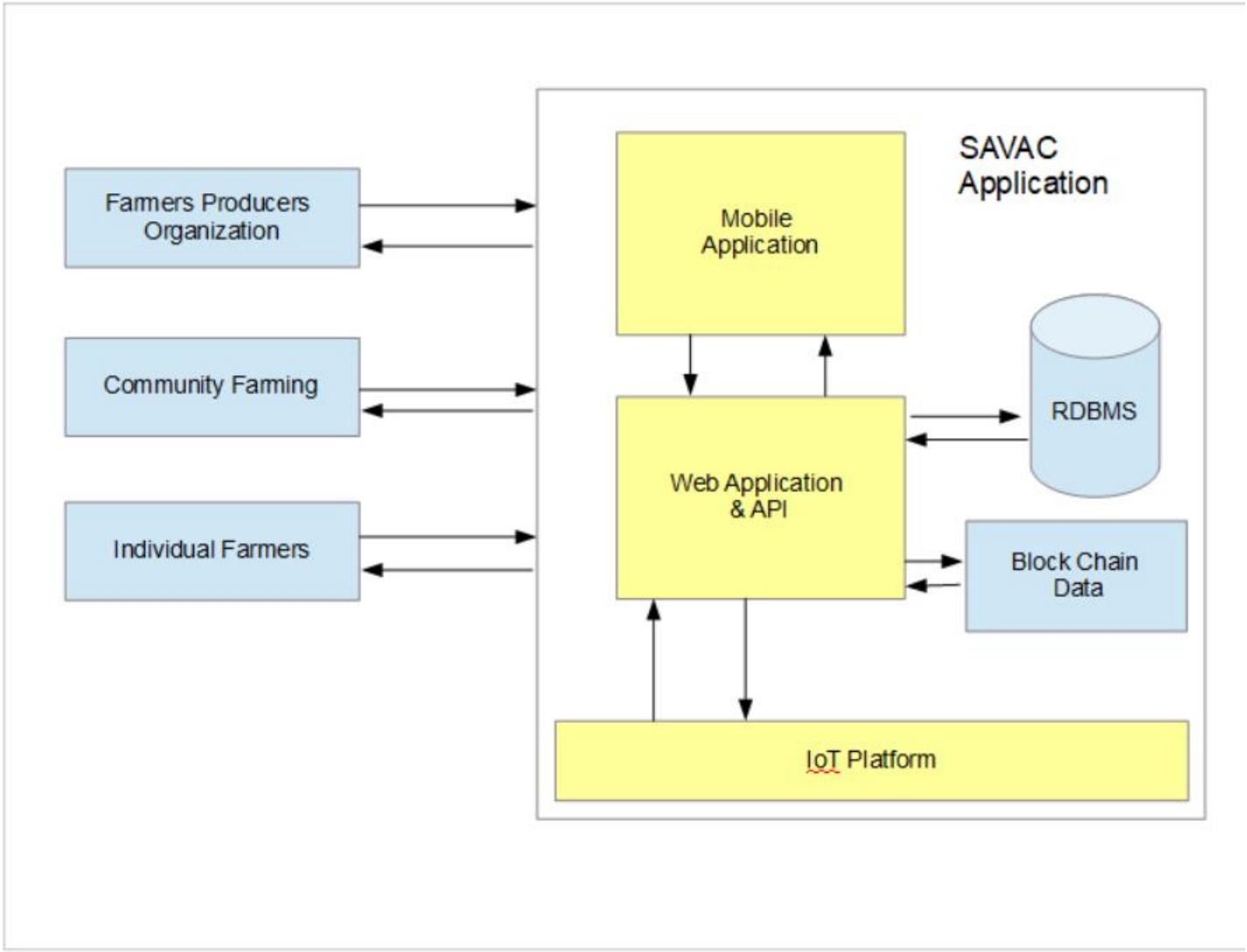

Farmers , ICAR institution have larger role to play in supply chain
Safe to eat Turmeric powder backed by lab reports
Established Turmeric products with traceability
Improve the prospect and market linkage of IISR products
SAVAC Supply Chain Model
Predictable yield with clear and clean agro inputs
Addition of new turmeric product in supply chain
Hassle free post harvesting process with quality control parameters
Good quality end product with good soil health
Good quality products without need for any adulterant
Good quality seeding materials which require less efforts and time is supply chain


Controlled and monitored farming inputs and lab test
Well structured farming operation under GAP of IISR.
Branding and block chain
Modern and well organized post harvesting with Turmeric boilers, polisher, electric drying dryer etc which help control quality, hygiene.
Improving the value of turmeric by creating new products with new application
Regular monitoring using IoT devices to ensure right action is taken at right time
Promotion and propagation of IISR Pragati turmeric by making it available in supply chain
Direct procurement, clear and clean supply chain right up to the customer.
Regular soil and water testing to ensure right condition prevail in cultivated area
Popularizing of IISR seeding materials, guidelines and products

SAVAC System Process Flow



SAVAC Technical Component Architecture Diagram



Critical hardware Components and its Applications

Digital soil testing equipment developed by IARI.

This equipment tests 14 parameters, including Ph, organic carbon, Zinc etc. Provide fast and reliable data (can issue soil health cards) without going to soil labs which takes a month. Not only save time and money but also aids us in making the best possible action in all stages of crop growth.

The primary role of this equipment is to diagnose soil conditions which enable us to provide precise nutrients and minerals which directly impact crop production.

Secondary role of this equipment is to act as a monitor of soil health all the way to harvesting; It also helps us to record real time data on performance of ICAR-IISR agro inputs.

Digital nature of the equipment helps us to integrate the data into our IOT platform in real time.

Portable and rapid nature of the equipment helps us to be flexible and able to operate in multiple environments.

Portable irrigation water testing equipment

Along with soil, water is a major input for crops and this portable and rapid testing equipment helps us to monitor water quality of our operation. Water quality parameters of PH,SAR,RSC, Alkalinity are tested and proper action can be taken to help improve the crop yield.

Easy to use and rapid nature of the equipment helps us to control quality of water on each stage of crop production

The primary role of this equipment is to provide fast and onsite data collection which helps us to control the quality of the crop output.

Secondary role of this equipment is to act as monitor of water quality all the way to harvesting and data profiling of water usage for setting us knowledge base

Turmeric boiler:

This machine is the first component of post harvest operation.

This machine helps us to boil the turmeric rhizomes under hygienic conditions with less manpower and fuel.

Primary role is to convert fresh turmeric into suitable processing materials for next stage operation

Secondary role is to be the first line of quality controller of the end product and provide data on temperature, timing, weight loss of boiled turmeric for knowledge base

Turmeric polisher:

The second stage of processing is made possible by this machine. Turmeric polisher is used to polish the rough and hard outer surface of the boiled and dried turmeric and thus improves its color. Turmeric is polished by an abrasive hard surface and against rough perforated surface when the turmeric-filled drum rotates as well as by rubbing rhizomes against each other.

Primary role is to polish fresh turmeric to help retain the natural color of turmeric.

Secondary role is to minimize fungus attack and rotting of dry turmeric and provide real time data on operation on visible improvement, weight loss for knowledge base

Electric dryer:

The main compound of processing is taken care of by this equipment. Boiled, polished turmeric is dried under the right temperature and time. This equipment has an advantage over traditional sun dry or solar dryers which give unpredictable results and expose the cleaned and polished turmeric to the elements.

Primary role is to convert fresh turmeric into dry turmeric which increases the shelf life and open to other value addition products. The duration of the operation is significantly reduced and better control over the output.

Secondary role is quality control by minimizing exposure to the elements and providing better predicted output, record data on temperature, timing, weight loss for knowledge base.

Vacuum pack machine

Once the Turmeric is dried some stock will be subjected to vacuum packing by this machine. This is done to increase the shelf life of dry turmeric and help balance the supply chain.

This machine takes out air from the pack creating a vacuum atmosphere for preserving turmeric by curtailing effects of oxidation and moisture which lead to damage.

Primary role is to preserve dry turmeric for future use.

Secondary role is to minimize loss of weight and oil content of dry turmeric which gets degraded by time and provide data on improvement possible by vacuum pack for knowledge base

Ribbon blender

Once the dry ginger is pulverized at IISR incubation center, portion of the turmeric powder will be blended with black pepper powder at precise ration to make Curcumin booster mix(innovative value addition product from turmeric)

Ribbon blender gives precise output of the above mixture.

Primary role is to make fine homogenized powder without any lumps

Secondary use is to limit human involvement and gives consistent result every time and build data on procedures and effects

Automatic pouch packing machine

Main portion of turmeric powder will be fed to this machine which will pack in 50G, 100G and 250G packs. The fully automatic machine reduces man power, gives reliable output and most importantly limits the entry of foreign particles.

Primary role will be seamlessly pack the end product with basic manpower

Secondary role is to be the last line of quality controllers of the end product.

Critical software components and applications

Mobile application with integrated IOT device

1) Mobile Application
   The mobile application is mainly focus to the farmers/FPO/Farming community who are selected by SAVAC. This is used for data collection and notification& selling purpose. The mobile application have the following modules.
   1. a) User Profile
      Here user can enter, edit and update his/her profile data and also change password.

   1. b) Good Agricultural Practice Training Module

      By using this section farmers can attend remote trainings provided by SAVAC.

   1. c) Notification & Chat Module
      This will update the user about the messages from SAVAC system. Eg. Periodic

   1. d) Deficiency & Disease Recognition Module

1. e) Smart Calendar

1. f) Reporting Module

1. g) Smart Contract Module

1. h) Sales Module

(Seeds/Turmeric Micro Nutrient /Trichoderma Capsule/Value Added Products of SAVAC)

2) Web Application with API

Web application with API is used for providing back end support and also to make dashboard for data analysis purpose.

3) RDBMS & Block Chain Technology

There are two types of data storage mechanism is used for this project.RDBMS(Relational Database Management System) for authentication and normal working of the system. Block Chain for tracking the supply chain.

4) IoT Platform

IoT platform helps to collect the data from different sensors available through digital soil testing equipment, real time field data.